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MICHIGAN STATE REPRESENTATIVE  
27TH DISTRICT

COMMITTEES  
CHAIR, COMMERCE  
EDUCATION  
JUDICIARY  
NEW ECONOMY AND QUALITY OF LIFE  
TAX POLICY

### *House Bills 4616, 4617 and 4618:*

The package of bills introduced by Representatives Andy Meisner and Mark Meadows will allow limited embryonic stem cell research on embryos otherwise discarded as medical waste. The package also **increases penalties for human reproductive cloning**.

- The first bill (House Bill 4616) sponsored by Representative Meisner removes Michigan's restrictions on embryonic stem cell research, though **only allowing research on embryos unneeded or unsuitable for implantation**. There are 400,000 frozen embryos in storage in fertility clinics around the country. This legislation would allow donors the choice of using them for this life-saving research.
- The bill **prohibits embryo donors from receiving any financial or other benefit** from the donation.
- The bill **requires informed and written consent** for the donation.
- House Bill 4616 will also remove Michigan's restrictions on somatic cell nuclear transfer, which is needed to create stem cells matching a patient's DNA. Without this procedure, patients will have to leave the state of Michigan to receive treatment.
- The second and third bills (House Bills 4617 and 4618) sponsored by Rep. Meadows, will increase penalties for those who attempt human reproductive cloning. No responsible researcher or policy maker is advocating for reproductive cloning.
- House Bill 4617 increases the penalties.
- House Bill 4618 adjusts the sentencing guidelines.

The legislation is modeled after the Stem Cell Research Enhancement Act of 2007, which passed the U.S. House and Senate with bi-partisan votes, and a constitutional amendment passed by Missouri voters in 2006.

## What others are saying

"I come to this issue as a proud Right-to-Life Senator. While I admire and respect those who do not share my views on this, I do believe, very strongly, that it is possible to be both anti-abortion and pro-embryonic stem cell research. A critical part of being pro-life is to support measures that help the living. And this research enhances, not diminishes, human life."

**Republican Senator Orrin Hatch**

July 18, 2006

"I am pro-life. I believe human life begins at conception... I also believe that embryonic stem cell research should be encouraged and supported. But, just as I said in 2001, it should advance in a manner that affords all human life dignity and respect -- the same dignity and respect we bring to the table as we work with children and adults to advance the frontiers of medicine and health... Embryonic stem cell research must be supported. It's time for a modified policy."

**Republican Senate Majority Leader Bill Frist**

July 29, 2005

"The concern of many opponents of the research has been that stem cells derived from human embryos would potentially destroy life. The fact is that the only human embryos that are used as a basis for stem-cell research are those that would otherwise be discarded from in vitro fertilization clinics. This is not a matter of using a human embryo that has the potential to produce life. Rather, these otherwise discarded embryos have the potential to save lives."

**Republican Senator Arlen Specter**

May 21, 2004

"Unfortunately, at a time we should be welcoming the 21st-century's best minds, we've hung "Scientists do not enter" signs on our borders. Michigan boasts one of the most inhospitable environments in the nation for cutting-edge medical research. The amazing medical breakthroughs made possible by embryonic stem cell research -- with the potential to improve the quality and length of our lives -- will happen somewhere else if Michigan continues to opt out."

**A. Alfred Taubman**

August 1, 2007

"Michigan law doesn't protect embryos from destruction, it only prevents Michigan scientists from conducting medical research that is being done by scientists throughout most of the rest of the country. We've been leaders at the U of M in all research, and this legislation prevents us from doing many things with stem cells that we would like to do."

**Dr. Sean Morrison**

Director of the University of Michigan's Center for Stem Cell Biology  
January 23, 2007

# Embryonic Stem Cell Research

## Myths

## Facts

<ul style="list-style-type: none"> <li>Embryonic stem cell research has led to no cures, and may not for decades or ever. Adult stem cell research is all we need to meet the needs of the sick and disabled.</li> </ul>	<ul style="list-style-type: none"> <li>After 40 years of research on adult stem cells, some treatments are being brought into use. Embryonic stem cell research has been conducted for less than a decade. Clinical studies using embryonic stem cells are set to start fall 2008.</li> <li>We support adult as well as embryonic stem cell research. Science works best when scientists can pursue all avenues of research. If the cure for Parkinson's disease or juvenile diabetes lay behind one of four doors, wouldn't you want the option to open all four doors at once instead of one door?</li> </ul>
<ul style="list-style-type: none"> <li>Somatic Cell Nuclear Transfer to produce human embryonic stem cells is human cloning. Cloned human embryos are created by the same technique as Dolly the sheep and destroyed.</li> </ul>	<ul style="list-style-type: none"> <li>Nuclear transfer is NOT cloning to create a baby. It is an advanced, promising technique of stem cell research. It involves no fertilization by sperm and no implantation in the womb. Dolly was created using REPRODUCTIVE cloning and no ethical scientist or regulatory body supports human reproductive cloning. Nuclear Transfer, also called THERAPEUTIC cloning, occurs when the genetic material from an adult cell is used to replace the genetic material in an unfertilized egg in a Petri dish – not a human uterus, which is necessary to create a human. Nuclear Transfer allows for the creation of donor-specific stem cells, important for medical treatments because it would eliminate the need for a lifetime of anti-rejection drugs. Proposed changes in Michigan's laws would <u>strengthen the ban</u> on even attempting human cloning, to prevent such cells from being placed into a uterus.</li> </ul>
<ul style="list-style-type: none"> <li>Embryonic stem cell (ESC) research kills human embryos to harvest their stem cells. This is destroying life.</li> </ul>	<ul style="list-style-type: none"> <li>Embryos at in vitro fertilization clinics today are routinely destroyed once the donors no longer need them. Michigan's laws do not stop that destruction, so embryos are discarded as medical waste rather than being used for potentially life-saving medical research. <u>Blocking embryonic stem cell research does not save a single embryo.</u></li> </ul>
<ul style="list-style-type: none"> <li>Embryonic stem cell research exploits women by paying them for their eggs, which can be a dangerous procedure. Embryonic stem cell research will require harvesting of millions of eggs.</li> </ul>	<ul style="list-style-type: none"> <li>Legislation under consideration in Michigan would only allow research on embryos already in fertility clinics with the written consent of donors. Donors would also be prevented from receiving any financial benefits.</li> </ul>
<ul style="list-style-type: none"> <li>Fetuses will be destroyed by embryonic stem cell research.</li> </ul>	<ul style="list-style-type: none"> <li>The proposed changes in Michigan's laws would only allow research using four to five day old microscopic embryos that have never been implanted in a woman's uterus.</li> </ul>
<ul style="list-style-type: none"> <li>We should not waste resources researching embryonic stem cells when adult stem cells hold so much promise.</li> </ul>	<ul style="list-style-type: none"> <li>We should allow researchers to go where the science takes them. After 40 years, there have been a few treatments resulting from adult stem cell research, although not as many as some purport (6 approved treatments as of July 28, 2006; <i>Science</i>; <a href="http://www.sciencemag.org">www.sciencemag.org</a>). Embryonic stem cell research offers the medical community a vast, promising new frontier of research.</li> </ul>
<ul style="list-style-type: none"> <li>Embryonic stem cells can create tumors.</li> </ul>	<ul style="list-style-type: none"> <li>Physicians are not proposing to inject embryonic stem cells themselves, but rather the specialized cells that derive from the cells to become muscle, blood, bone or other types of cells. When the specialized cells derived from embryonic stem cells have been injected in animal models, tumors do not develop and the cells can reduce disease symptoms.</li> </ul>

# THE GRAND RAPIDS PRESS

October 28, 2007

## Embryonic stem cells could be ballot issue

TED ROELOFS

GRAND RAPIDS -- In fertility clinics nationwide, an estimated 500,000 embryos lie in liquid nitrogen limbo and beg a difficult question: Should these tiny cell clumps be used to research cures for everything from cancer to multiple sclerosis to Parkinson's disease? Or does that amount to destruction of human life?

But, in a state ravaged by high-wage job losses, that dilemma may be trumped by another looming question: Can Michigan afford to turn its back on the economics of embryonic stem cell research?

It is an issue voters could be asked to settle on the November 2008 ballot in what could be an epic showdown of money versus morality.

Grand Rapids physician Paul Farr thinks Michigan is missing more than science because of its severe restrictions on the research. He likes to imagine Grand Rapids' keystone research facility, the Van Andel Institute, could lead the way to a new economy.

"This could prove a wonderful economic opportunity," said Farr, past president of the Michigan State Medical Society.

"When you couple (the promise of embryonic stem cell research) with a research facility like the Van Andel Institute, that really is on the leading edge in so many areas, it could really make a difference."

States from California to Connecticut to New Jersey have jumped aboard the fledgling science of embryonic stem cell research, pouring hundreds of millions of dollars into the effort.

Michigan goes beyond not funding such research. It stands with five other states -- including Bible Belt strongholds Louisiana, Arkansas and North and South Dakota -- in severely curtailing it.

And, thus far, Grand Rapids' signature medical research facility, the Van Andel Institute, is not interested.

"From our standpoint, we don't do it. We have not had a request from our staff to do it," said institute chairman David Van Andel.

With an annual budget of \$23 million and 180 researchers, the institute is the dominant research player in West Michigan. It plans to triple its research staff by 2009.

"Unless science dramatically changes to point us in a different direction, I don't see us engaging in it," Van Andel said.

But he did leave the door open.

"You never say never," Van Andel added.

### Hostile research climate

A group that supports lifting the restrictions isn't prepared to wait that long.

Frustrated by the failure of the Legislature to deal with the issue, Michigan Citizens for Stem Cell Research & Cures has filed paperwork with the state to put it on next year's ballot. It expects to decide by the end of the year whether it will.

Earlier this month, Bloomfield Hills shopping mall magnate A. Alfred Taubman threw his support behind the effort with a \$1.4 million donation to the organization. He also promised to donate to the campaign if the issue goes to the ballot.

Taubman also has donated \$7 million to Eva Feldman, a noted University of Michigan researcher of Lou Gehrig's disease. Because of Michigan's laws, Feldman had to join a research project in California.

Another U-M researcher fears the state is losing this research race.

"The law in Michigan puts us at such a disadvantage in embryonic stem cell research that people in that area don't even apply for jobs here," said Sean Morrison, director of the U-M Center for Stem Cell Biology.

The center is one of only three embryonic stem cell research centers funded by the National Institutes of Health in the United States.

"While there are other states that are literally investing billions in this, we are literally threatening to put people in jail for this," Morrison said.

Under Michigan law that dates back to 1978, scientists are banned from any research that would destroy human embryos. State law passed in 1998 makes it a crime--with a penalty of up to \$10 million and 10 years in prison--to perform therapeutic cloning, the transplant of DNA from an individual into an embryo to grow tissue or organs. Michigan researchers are effectively limited to existing embryonic cell lines imported from other states.

Morrison believes the research climate sends a chilling message to prospective bio-tech companies: Michigan is not a good place to set up shop.

Morrison is one of the founders of OncoMed Pharmaceuticals Inc., a medical research firm founded in 2004 that is focused on the role of stem cells in allowing cancer to spread. Its original home was Michigan.

"The first thing the investors wanted to do was move it to California," Morrison said. OncoMed is now based in a San Francisco suburb and has reported more than \$50 million in venture capital.

Cancer researcher Michael Clarke left his job at U-M in 2005 to take a position at the Stanford Cancer Center, joining a tide of researchers drawn to California by the passage of Proposition 71. Clarke oversaw laboratory studies that were the first to isolate stem cells from breast tumors.

Earlier this month, Clarke said on a national public television report about the exodus of researchers to California: "I think Stanford in particular, and California in general, is a much richer environment for doing science."

#### **University reputation at risk**

U-M President Mary Sue Coleman said the university risks losing its prestige as a preeminent research facility if the law is not changed.

"It will become ever more difficult to keep some of the best people in the field," said Coleman, whose perspective is shaped by her doctorate in biochemistry.

"As a scientist, I believe embryonic stem cell research is one of the promising research fields of our time. I do believe it is going to be the science of the 21st century."

#### **Ethical questions**

Indeed, the high-stakes interstate competition in this field only intensified with the decision by President Bush in 2001 to limit federal funding to a few dozen lines of embryonic stem cells already in existence. Many of the lines proved to be contaminated. Bush's decision hardly settled the matter. Debate has deepened as public policy struggled to keep pace with a science that some think is tampering with the province of God.

In 1998, researchers isolated human embryonic stem cells grown from embryos created in the laboratory by couples seeking to get pregnant through in vitro fertilization.

Because stem cells can be teased to become virtually any kind of cell, many deemed it a watershed research breakthrough. Critics saw a slippery ethical slope.

With more than 400 fertility clinics nationwide generating thousands of extra embryos a year, there are now a half-million surplus. Some are discarded. A small number are "adopted" by couples who have the embryos implanted in a prospective mother's womb with hopes of producing a baby. Most lie in storage at 320 degrees below zero, with little prospect they will ever be used.

#### **Is this life?**

"Every time stem cells are removed from a human embryo, a unique human life is killed," said Pam Sherstad, spokeswoman for Right to Life of Michigan.

Pushing back against both the ethics and economics of this research, Sherstad and other critics say its potential has been exaggerated. They note treatments based on adult stem cells have a proven track record that includes therapies for lymphoma and leukemia.

Proponents concede it has yet to be linked with any proven human treatment, while noting the research is in relative infancy.

"Right to Life of Michigan is very supportive of the other types of research that do not require the killing of a human being," Sherstad said.

Earlier this month, more than 500,000 Catholic households statewide, including about 55,000 in West Michigan, were mailed packets from the Michigan Catholic Conference signed by the state's seven bishops.

A 12-minute DVD and brochure outlined the church's opposition to embryonic stem-cell research and its support of using adult stem cells instead.

Bishop Walter Hurley of the Grand Rapids Catholic Diocese said the issue goes to "the very core of who we are as God's people."

"Life comes to us as a gift from God," said the leader of West Michigan's 175,000 Catholics. "We need to treasure it and watch over it in all its forms, from the very beginning to the grave."

In what sounds like a political warning shot, the Michigan Catholic Conference released a poll Wednesday showing 80 percent of state Catholics are opposed to stem cell research that "kills the human embryo."

### **Expensive initiative**

The church's rhetoric is a graphic reminder any ballot issue here would likely stir the same passions that marked the 2006 ballot proposal in Missouri.

After a bitter campaign notable for Rush Limbaugh's taunting mimicry of research advocate Michael J. Fox and his Parkinson's symptoms, Missouri voters narrowly lifted that state's restrictions.

Missouri proponents of embryonic stem cell research spent \$30 million on the campaign, the bulk from the billionaire founders of a biomedical research firm.

Opposition was led by the Missouri Catholic Conference and Missouri Right to Life.

It is thought a similar campaign would need at least \$15 million to have a chance in Michigan.

Caledonia resident Cathy Coury has been fighting for embryonic stem research for years. But for her, it's about more than economics.

Coury has two children with juvenile diabetes, Nicholas, 9, and Gabriel, 13. In 2002, she went before Congress to ask for expanded federal funding for disease.

She now believes embryonic stem cell research might offer a cure.

"For me, it hits home pretty strongly," Coury said.





# The Detroit News

October 22, 2007

## Michigan fights for stem cell cash

*But state's restrictive laws drive away business, advocates say*  
KIM KOZLOWSKI

Michigan is losing businesses, jobs and some of its best scientists because of restrictive embryonic stem cell research laws, according to scientists and others seeking to change the research climate.

Though proponents have long touted the promise embryonic stem cells hold for people with incurable diseases, they are beginning to focus on Michigan's missed economic opportunities.

"Other states are seeing embryonic stem cell research has major economic development potential ... and are moving into this area in a big way because they smell jobs," said David Waymire, a spokesman for Michigan Stem Cell Research and Cures. "One hundred years ago, a small operation run by a guy named Henry Ford spawned a vast industry. We should be careful not to tell the Henry Fords of stem cell research that Michigan is closed for business."

Embryonic stem cell research, however, has vocal opponents, who say it involves taking human life and could eventually lead to human cloning, which is immoral.

The Michigan Catholic Conference this month launched an aggressive campaign by mailing DVDs to hundreds of Catholic homes and asking priests to speak on the issue during Mass.

Right to Life of Michigan and others say adult stem cell research, which is allowed in Michigan, has developed the most potential treatments for disease thus far, and treatments and cures can be found without destroying human embryos.

They point to people like Jeni Rummelt, a Grand Rapids woman who is paralyzed from the waist down. She is slowly gaining mobility and sensation from physical therapy and her own adult stem cells, which she receives in Russia through a treatment that is not approved in the U.S.

"It could take a few more years until I walk again, but it's worth it," said Rummelt, 32.

### Gov wants laws loosened

Scientists say most of the embryos they want to study are being thrown away as medical waste from fertility clinics, yet they hold great promise for better therapies and possibly cures for diseases such as Parkinson's, Alzheimer's and juvenile diabetes.

Gov. Jennifer Granholm has advocated loosening Michigan's embryonic stem cell laws, which subject researchers to up to five years in prison for using human embryos in non-therapeutic research.

The state has not conducted any economic impact studies regarding the business of embryonic stem cell research. This contrasts sharply with other states, such as California, Massachusetts and New Jersey, which have done studies and invested billions of state dollars as a result.

California has taken the lead nationally by passing a ballot issue that allowed the state to invest \$3 billion in stem cell research over 10 years. The investment is projected to generate state revenues and health care cost savings of between \$6.4 billion and \$12.6 billion, according to an economic impact report by the Analysis Group Inc.

Michigan, one of five states in the nation that does not allow the development of new embryonic stem cell lines, is focused on easing legal restrictions. A hearing on three bills will be Oct. 31 before the House Judiciary Committee. The bills aim to allow embryonic stem cell research but increase penalties for human cloning, one of the fears cited by opponents of the research.

Activists are contemplating a ballot initiative to let voters decide in November 2008 if legislative efforts fail.

### **Business is discouraged**

It's important that Michigan change its law not only to move toward finding better treatments and cures of diseases but also to foster a more positive business environment, said James Eliason, vice president for external development for Asterand, a tissue research company in Wayne State University's TechTown.

"The current law gives a negative impression to anybody who would want to move into the state with a high-tech life sciences company," Eliason said.

"Even if they weren't intending to work on stem cells, it can send a negative message about what's the next thing they might want to outlaw."

If Michigan doesn't change its laws, proponents say, other states seeking to expand life science and biotech industries will continue to court Michigan businesses such as BioFlow Industries, a Whitmore Lake start-up firm developing equipment for studying human cells.

Owner Lee Noll recently traveled to North Carolina and later this month is flying to Texas to meet with investors who want him to move his business.

Noll doesn't want to leave Michigan, but he said he might have to because his fledging company needs investors to expand into what he expects will be a \$50 million venture within five years. Few Michigan investors are willing to take the risk.

"Our product can be used for adult stem cell research as well as embryonic stem cell research," said Noll. "The jury is still out as to which of those sources is most beneficial. Because of that we need to test our tool on both."

Universities in states with less restrictive laws on stem cell research have begun courting some of Michigan's brightest scientists.

Among them is Bennett Novitch, who was an assistant professor of cell and developmental biology at the University of Michigan until Sept. 1. He has taken his work on neuron stem cells to University of California-Los Angeles. Novitch's work involves animals, but embryonic stem cells could be involved in the future.

While opponents of embryonic stem cell research point to the potential of adult stem cells, advocates say scientists should study both.

Though adult stem cells have shown great promise, they are limited, scientists say, while embryonic stem cells have nearly endless potential in their ability to reproduce other cells.

"As somebody who performs adult stem cell research every day, if we're serious about curing disease we should be studying both embryonic and adult stem cells," said Sean Morrison, director of U-M's Center for Stem Cell Biology.

You can reach Kim Kozlowski at (313) 222-2024 or [kkozlowski@detnews.com](mailto:kkozlowski@detnews.com).

# The Detroit News

August 1, 2007

## **Stem cell ban hurts Michigan**

*Prohibition on embryonic research repels best medical minds from state*  
A. ALFRED TAUBMAN

One hundred years ago, Michigan's economy was the envy of the world. Inventors and entrepreneurs were flocking here from all over the world to start their businesses, make their fortunes and change the world.

Today people, companies and industries are fleeing the state. We desperately look to recapture some of the magic we created at the turn of the last century.

History can repeat itself. But I'm very concerned that in one critical respect we may be our own worst enemy -- with the restrictions the state puts on medical research.

### **Build on medical legacy**

Examining our past success, the first names that come to mind are the likes of Ford, Olds, Sloan and Durant. But to help chart our future, I suggest we focus on a different set of high-achieving Michiganians: William Upjohn, Herbert Dow, Hervey Parke and George Davis.

We tend to overlook it, but at the same time we were putting the world on wheels at the turn of the last century, we were leading a revolution in chemistry, science and medicine.

Dow Chemical, founded in Midland in 1897, was extracting bromine from our soil. Upjohn, founded in Kalamazoo in 1886, was perfecting the first large-scale production of cortisone. Parke-Davis, founded in Detroit in 1886, was conducting clinical trials in the first modern pharmaceutical laboratory in the world, creating the first bacterial vaccines.

With all due respect for my friends in the auto industry (who make terrific cars and trucks), if lightning is going to strike twice for our state, it's far more likely to be in science than manufacturing. The frontiers of biotechnology and life sciences have never been more promising. And we have much of the formula for success in place: great research universities; abundant natural resources (especially the essential and increasingly precious element of water); and a talented work force anxious to get back on the job.

### **Scientists scared away**

Unfortunately, at a time we should be welcoming the 21st-century's best minds, we've hung "Scientists do not enter" signs on our borders. Michigan boasts one of the most inhospitable environments in the nation for cutting-edge medical research. My friends in the medical community (at 83, I'm one of their best customers) tell me that it's becoming increasingly difficult to recruit young chemists and medical researchers to our universities.

Why? In part, because embryonic stem cell research is essentially illegal in Michigan. Our researchers are permitted to work with stem cells from the tissue of adults, children, umbilical cords and developing fetuses. But the vast majority of scientists agree that stem cells from embryos, with the ability to reproduce themselves into any one of hundreds of cells found in the human body, hold the greatest promise.

The amazing medical breakthroughs made possible by embryonic stem cell research -- with the potential to improve the quality and length of our lives -- will happen somewhere else if Michigan continues to opt out.

For example, I'm funding promising research at the University of Michigan to find a cure for amyotrophic lateral sclerosis, better known as Lou Gehrig's disease. Some of the highest incidence rates in the world of this devastating disease are found right here in Michigan. But much of the work directed by the U-M research team

has to be done in California, where there is access to new lines of embryonic stem cells from fertility clinic patients who have voluntarily donated their left-over embryos rather than have them discarded as medical waste.

Under current state law, if this critical work were done in a U-M laboratory, the scientists could be sent to prison for up to 10 years and be fined up to \$10 million.

### **Out of the mainstream**

We're really out of step with mainstream scientific and political thought on this issue. No lesser an authority than the National Institutes of Health encourages the pursuit of embryonic stem cell research, along with the less controversial work being done with adult stem cells.

Now, I know that this is an emotional issue. The question of when a viable human life begins is a very personal matter, but so is the question of denying you or a loved one life-saving medical treatments and cures.

It may seem insensitive to have this debate in the context of jobs and economics. But as a state at risk, we need to have an honest, dispassionate examination of the facts, risks and rewards. Beliefs on all sides are heartfelt and deserve our fullest respect.

So let's have the discussion -- from Grand Rapids to Detroit -- and see if we can't craft the most ethical and effective stem cell research regulations in the nation. If our legislators lack the political will to tackle this in Lansing, let's put the question to the voters in November 2008.

Michigan is in a global race just like the one Ford and Sloan, as well as Upjohn, Dow, Parke and Davis, helped Michigan win 100 years ago. And the rewards -- in both economic and human terms -- are far, far greater.

*A. Alfred Taubman is the founder of Taubman Centers Inc., a Bloomfield Hills-based real estate development firm.*



Coalition for the Advancement of Medical Research

**IN CASE YOU WANT THE UNBIASED, BIPARTISAN TRUTH:  
EMBRYONIC STEM CELL RESEARCH SHOWS GREAT PROMISE**

**From Sean Tipton, president, Coalition for the Advancement of Medical Research (CAMR)** -- "Embryonic stem cell research opponents selectively and irresponsibly tout individual studies when it's politically convenient. The nationally recognized and prestigious universities, scientists, medical schools, research organizations and foundations that CAMR represents want all sides of the story to be told on this issue. We need a federal policy change on embryonic stem cell research, and we look forward to the House and Senate passing the Stem Cell Research Enhancement Act early in this 110th Congress."

The Washington Post: "Atala and other scientists emphasized that they don't believe the [amniotic] cells will make embryonic stem cells irrelevant. 'There's not going to be one shoe that fits all,' said Robert Lanza, scientific director at Advanced Cell Technology in Worcester, Mass. 'We're going to have to see which ones are most useful for which clinical conditions.' George Daley, a Harvard stem cell researcher, echoed that sentiment. 'They are not a replacement for embryonic stem cells.'" **(Rick Weiss, "Scientists See Potential in Amniotic Stem Cells," The Washington Post, 1/8/07)**

Bloomberg: "Many laboratories have claimed to have found cells outside the embryo that share the ability to become a wide variety of tissues, said Jeanne Loring, a researcher at the Burnham Institute in La Jolla, California, who has been working with stem cells for 20 years. 'Other laboratories will have to replicate the work with the amniotic cells before it's accepted,' she said. 'We're all very cautious because people have been wrong so many times,'" **(John Lauerma, "Amniotic Stem Cells Offer Alternative to Embryonic, Adult Cells," Bloomberg News, 1/8/07)**

Associated Press: "But Dr. Anthony Atala, head of Wake Forest's regenerative medicine institute and the senior researcher on the project, said the scientists still don't know exactly how many different cell types can be made from the stem cells found in amniotic fluid. The scientists said preliminary tests in patients are years away. 'While they are fascinating subjects of study in their own right, they are not a substitute for human embryonic stem cells, which allow scientists to address a host of other interesting questions in early human development,' said [Harvard University scientist] Dr. George Daley." **(The Associated Press, "Report: Amniotic fluid yields stem cells", MSNBC.com, 1/8/07)**

The New York Times: "But all stem cells are not alike, and an early read by the Science desk here at The Times suggests that the [amniotic] cells harvested this way may not be as versatile and useful as the ones harvested from embryos, which are called pluripotent stem cells. Stem cells of the multipotent type, like those isolated from adult tissue, have so far been of much less use to researchers, in part because they have been very difficult to grow in the lab." **(Tom Zeller, Jr., The New York Times; The Lede, 1/8/07)**

Los Angeles Times: "It is still unclear whether stem cells from amniotic fluid — the liquid that cushions fetuses in the womb — can produce the range of cell types that embryonic stem cells can. 'It makes me wonder how pluripotent they are,' said [Larry] Goldstein, [UC, San Diego] who was not involved in the study. Though the cells might prove useful in some circumstances, Goldstein said, they aren't a substitute for embryonic stem cells. 'They built a screwdriver here, but I need a wrench,' he said." **(Karen Kaplan, "Stem Cells in Amniotic Fluid Show Great Promise, Study Says," 1/8/07)**

USA Today: "But as a number of reports note, the research is young compared to what is known about embryonic stem cell studies. It is still unclear whether stem cells from amniotic fluid - the liquid that cushions babies in the womb -- can give rise to the full range of cell types that embryonic stem cells can produce." **(Patrick Cooper, "On Deadline: More backing for amniotic stem cells?," USA Today online, Jan. 8, 2007)**

Globe and Mail: "But both Dr. Atala and other stem-cell experts agree that much remains to be learned about these [amniotic] cells. 'I don't think it's going to replace embryonic stem cell research at this point. Lots has to be done to see a clear picture of these cells,' said Andras Nagy, a senior scientist at the Samuel Lunenfeld Research Institute at Toronto's Mount Sinai Hospital. 'We have to find out, what are the limitations of these cells? What are these cells? We have to be very careful not to get overexcited.' Dr. Nagy, who developed the first two human embryonic stem cell lines in Canada, said it may be that different diseases could be treated with stem cells derived from different sources. Still, he said, he doubted these new amniotic cells 'will be able to do as many things as embryonic stem cells.' " **(Carolyn Abraham, "Amniotic fluids bring stem cell boost," 1/8/07)**

Juvenile Diabetes Research Foundation Statement: "Because our knowledge of amniotic fluid-derived stem cells is so preliminary, we believe it is critical for JDRF and other organizations to support research exploring the potential and promise of all types of stem cells- embryonic stem cells, adult stem cells, and amniotic fluid-derived and amnion-derived stem cells- to become mature functional cells to cure diabetes and other diseases." **[Dr. Richard Insel, Executive Vice President for Research at JDRF]**

"Amniotic cells are not embryonic stem cells. They are not pluripotent to the same degree and will be used for very different purposes in research and potentially medicine. They are not a replacement for embryonic stem cells. Growing cells from amniocentesis fluid is quite interesting, and the use for specific babies born with conditions that were found during ultrasound is fascinating and futuristic. I am quite bullish on the applications of fetal-derived amniotic cells for autologous treatments where the cells from a specific fetus are cultured for later use in the baby. In cases where a disorder is diagnosed in utero (e.g., diaphragmatic hernia, or certain developmental defects), this makes great sense, as the cells are 'self' to the baby." -- **George Daley, Harvard University**

# THE GRAND RAPIDS PRESS

September 19, 2006

## Coalition pushes state to ease stem cell limits

PAT SHELLNBARGER & SHARON EMERY

Many nights, Cathy Coury awakens, worrying her two young sons could slip into diabetic shock.

"It never leaves my mind, 24 hours a day, seven days a week," she said. "You feel like you're walking this tightrope all the time."

Both boys -- Gabriel, 12, and Nicholas, 8 -- could be freed from the insulin pumps that keep them alive, Coury believes, if Michigan law were changed, allowing researchers to use embryonic stem cells in their search for a cure.

That's why the Caledonia woman joined a coalition of scientists, politicians, parents and business and university representatives called Michigan Citizens for Stem Cell Research and Cures, urging state lawmakers to remove restrictions on embryonic stem cell research. The bipartisan, nonprofit group made its case for the first time Monday in Lansing.

"Michigan has significant assets invested in universities and firms, and we don't want these assets to be squandered," Democratic U.S. Sen. Carl Levin, of Detroit, said at a press conference that also included Republican U.S. Rep. Joe Schwarz, of Battle Creek.

Warning that Western, Wayne State and Michigan State universities, as well as the University of Michigan, could suffer as a result of Michigan's policies, Schwarz cautioned against "creating barriers at our state lines."

He said states such as California, New York and New Jersey were running away with the economic prize offered by the nascent life sciences industry.

The new group plans to educate the public about stem-cell research in forums throughout the state in coming months.

The group itself is devoted to education. But backers hope the public will lean on the Republican-controlled Legislature, which is resisting bills sponsored by Rep. Andrew Meisner, D-Ferndale, to ease prohibitions on stem-cell research that are among the most restrictive in the nation.

The process of extracting stem cells from an embryo destroys it, and Michigan law forbids research that harms an embryo.

Defenders of Michigan's law, including the Michigan Catholic Conference and Right to Life of Michigan, say the sanctity of human life is at stake.

"You don't sacrifice one human life to save another," said Dave Maluchnik, of the Catholic conference. "We must search for ethical ways to help those who are suffering from debilitating diseases," including research using adult stem cells.

He pointed to GOP-sponsored bills establishing a statewide network of umbilical-cord-blood stem cell banks that he said would not only promote medical cures but also boost the economy. Cord blood and bone marrow are key sources of adult stem cells. One of the bills would fund the effort with \$5 million from the 21st Century Jobs Fund.

Earlier this month, the state awarded \$45.7 million from the fund to 25 life sciences companies to help create jobs in the emerging industry.

How effective adult stem cells are in curing disease is up for debate. And backers of embryonic stem cell research believe all known tools should be used.

"You can't stand where I stand without feeling a sense of urgency" to find cures and treatments for diseases such as Parkinson's disease, Alzheimer's disease and cancer, said Sean Morrison, director of the U-M Center for Stem Cell Biology.

Coury, who volunteers as legislative chairwoman of the West Michigan chapter of the Juvenile Diabetes Research Foundation, attended Monday's press conference, although she had spent much of Sunday night trying to bring her youngest son's blood glucose level under control.

"Some days are better than others," she said.

The older son, Gabriel, was diagnosed with juvenile diabetes -- also known as type one diabetes -- when he was 4 years old. His younger brother, Nicholas, was diagnosed with the same disease when he was 15 months old. Since neither boy's pancreas is able to produce insulin to convert sugar into energy, each wears an insulin pump that provides the hormone through a tube inserted in the abdomen.

"They won't live a day without it," Coury said, but added: "I don't have a doubt they will see a cure in their lifetime. There's research going on for diabetes along many different avenues."

One of the most promising, she believes, involves embryos discarded by fertility clinics. Coury is aware of the moral issues surrounding embryonic stem cell research and opposition from groups like Right to Life.

"I wrestled with that," she said, "but when you look at the facts, these are embryos that already were created, and they're going to be thrown in the trash. It's almost akin to organ donations."

While some promote embryonic stem cell research as an economic boon to Michigan's medical research corridor, Coury sees it in more personal terms.

"It's the future of my children," she said.



# The Detroit News

April 23, 2007

## Free Michigan researchers to pursue cures

*New legislation would broaden stem cell research opportunities*  
EDITORIAL

Some Democratic lawmakers in the state House of Representatives have revived legislation to allow embryonic stem cell research in Michigan. The bills renew a necessary debate. Embryonic stem cell research should be allowed in this state.

Under current law, Michigan has some of the toughest restrictions on embryonic stem cell research in the country. Yet the state is attempting to position itself as a site for biomedical research as one way out of its economic freefall.

Opponents say researchers should focus on adult stem cell research, but scientists in the field say embryonic cells provide the most hope for medical breakthroughs in spinal cord injury, diabetes and other maladies.

Stem cell biologist Sean Morrison of the University of Michigan noted to The News last year that it is legal for fertility clinics to discard human embryos, but not to use them for research that could cure disease and injury. If the goal is to protect human embryos, the fact that they can simply be discarded makes the research ban a fruitless exercise.

It makes no sense and is damaging to the state's efforts to make use of its research assets at Michigan, Michigan State, Wayne State, all of which have medical and biological research programs, as well as the Van Andel medical research center near Grand Rapids.

Universities and research institutes in other states are moving ahead with projects that would put Michigan doctors in jail.

State Rep. Andy Meisner, D-Ferndale, and some of his colleagues are backing new legislation in the House that would deal with the topic more rationally. People are justifiably worried about cloning. So Meisner has increased the penalty for cloning to deter it while encouraging embryonic stem cell research.

Pointless laws on embryonic research are helping make Michigan a scientific backwater in this area of medical investigation. That ought to change.

# Lansing State Journal

www.lsj.com

January 30, 2006

## **Stem cells: Lifting state restrictions on research can help economy**

With all the talk about retooling Michigan's economy for the 21st century, one might hope Republican leaders would rally to Gov. Jennifer Granholm's call for ending state restrictions on stem-cell research. No such luck.

One national study estimates that, annually, \$440 million is invested in stem-cell research – money Michigan isn't getting due to state law. But the Republican response to Granholm's idea? Tepid.

Senate Majority Leader Ken Sikkema, R-Wyoming, says he's not persuaded by Granholm's proposal, which she pitched during last week's State of the State address.

Gubernatorial candidate Dick DeVos wouldn't even venture a viewpoint.

At least House Speaker Craig DeRoche, R-Novi, said lawmakers would review Granholm's proposal, though it's generally believed Republicans won't allow the vote to go to the full House.

These politicians are playing to the emotions and rhetoric of the anti-abortion crowd. In doing so, they stymie the chances for expanded stem-cell research, which holds great promises for finding cures to some of humankind's more debilitating diseases.

In a meeting last week with the LSJ Editorial Board, University of Michigan President Mary Sue Coleman described current state law as "stifling" to stem-cell research. U-M does have ongoing stem-cell research. But it's severely limited by state law.

As U-M officials explain, the state has a ban on making new stem cell lines. The university can only use stem cell lines created in other states. No wonder Nature Magazine says Michigan has one of the most restrictive stem-cell laws in the country. No wonder Michigan will continue having trouble attracting and retaining top-notch talent in the life sciences, if such laws remain on the books.

Opponents of stem-cell research claim the promise of this research is a fallacy; that the research has failed to find medical cures. That's like saying that since we haven't found evidence of extraterrestrial life, the rest of the universe must be dead.

There are numerous science-based indications that embryonic stem-cell research will someday lead to new treatments, and cures, for such devastating diseases as Alzheimer's and juvenile diabetes.

Thousands of human embryos are discarded each year as "medical waste." Rather than throwing them out, why not use them in a real pro-life way, by giving researchers the tools to better understand human disease?

Even the Republican-controlled U.S. House last year broke with President Bush and voted to lift federal restrictions on stem-cell research. We'd urge Republican lawmakers in Lansing to choose a similar path, and help end a "stifling" state law.

# THE ANN ARBOR NEWS

March 7, 2007

## **Stem cell research limits hurt Michigan Legislators need to change restrictions**

What are the two most restrictive states in the country regarding embryonic stem cell research?

South Dakota - and Michigan.

We're also in the company of Arkansas, Louisiana and North Dakota. These states have laws limiting embryonic stem cell research, and it's not a group we're proud to be part of.

There's a chance that we can divorce ourselves, but it'll take backbone from our state legislators to do so.

"The stem cell laws that we have in this state are one reason why people in the rest of country look at Michigan as an 'also-ran' when it comes to developing it as a biotechnology (center)," Sean Morrison, director of the University of Michigan's Center for Stem Cell Biology, recently told The News. "... It sends a message loud and clear that Michigan is not serious about having a biotech industry."

That industry in Michigan took a blow in January when Pfizer announced plans to close its Ann Arbor research facility by 2008. The pharmaceutical firm employs just over 2,100 people here, and countless others depend on Pfizer and its employees for their livelihoods. But the closure is more than a jobs hit - it's a psychic hit as well.

Though Pfizer remains a major employer in the Kalamazoo area, its withdrawal from Ann Arbor shows how vulnerable we are to decisions made in distant corporate boardrooms. Nothing is a given, and complacency isn't an option.

That's why reform to our laws regarding stem cell research is critical.

"Everything needs to be on the table," U-M Mary Sue Coleman told The News. "We need to look at what our climate is and how welcoming we are. Can we pursue the most promising (scientific) leads here? If there was ever time we need the state to have a wake-up, the time is now..."

Michigan law forbids destroying human embryos for research, even if that research yields treatments for life-threatening diseases. Yet fertility clinics regularly discard unused embryos. This disconnect is stunning.

Gov. Jennifer Granholm has said she'd support easing restrictions on stem cell research, but no one has yet introduced legislation on the issue. There was virtually no chance of action under a Republican controlled legislature, and even with Democrats now in the majority in the House, it's unclear if they'll make it a priority.

If they do, groups like the Michigan Catholic Conference and Right to Life will certainly marshal resources to oppose any change to current law.

But this is a battle worth fighting. Michigan's economy is undergoing an agonizing transformation after decades of coasting on the coattails of a powerful domestic auto industry. That industry itself is in a mighty struggle for survival, and efforts to diversify our economy - including efforts to build our biotech and life sciences businesses - are a necessary piece of the state's economic transformation.

A change in Michigan's law wouldn't be the kind of aggressive support we see in states like California, where voters approved \$3 billion over 10 years to fund stem cell research. In comparison, easing restrictions on Michigan's embryonic stem cell use would be a relatively modest step.

But in comparison to current conditions, it would keep us in the running with most of the country. And at the least, we need to be able to compete in that race.

June 10, 2007

## Stem-cell law

*State's research barrier illogical and harmful*

Michigan's severe restrictions on embryonic stem-cell research defy logic, and threaten to push the state's studies in this field to the scientific backwaters.

As it stands, surplus embryos created in Michigan for in vitro fertilization procedures can be, and are, discarded legally. But those same embryos, which hold much potential value for human medicine because of their versatility, are off-limits to the state's research laboratories.

Is it any wonder then that some who've been consistent members of the pro-life community believe robust embryonic stem-cell research not only should be legal, but the government should fund it?

Put U.S. Rep. Dale E. Kildee in that camp. The life-long Catholic, with a 42-year record opposing abortion, has voted twice this year for legislation that would ease federal restrictions on funding for stem-cell studies involving human embryos produced in fertility clinics.

While Kildee has taken no position on Michigan House bills that would lift the limits on embryonic stem-cell research, that principally reflects caution, because he's not familiar with the legislation introduced in April by Rep. Andy Meisner, D-Ferndale. For all intents and purposes, however, Kildee and Meisner are on the same page, unable in good conscience to forbid science that could lead to medical miracles when the crux of the state restrictions lack a rational basis.

It also puts Michigan in a minority of five states hamstringing this pioneering inquiry, while others are investing heavily. As a result, our plans to become a national leader in the life sciences - which could produce an economic boom - are being undermined. Researchers potentially eligible for millions in grants for embryonic stem-cell study in California or Illinois are threatened in Michigan with fines and prison if they undertake the same work.

That said, the economic gains from removing the hurdles to embryonic stem-cell study wouldn't be sufficient if something tangible was sacrificed as a result. But with many leftover embryos in fertility clinics destined to be destroyed regardless, preventing their use for life-enhancing research is beyond pointless.

Indeed, using the stem cells derived from them to possibly produce cures for Parkinson's and other degenerative diseases, or to repair body parts, such as a damaged spinal cord, is morally inspiring. Logically, therefore, Michigan has no case for maintaining a legal barrier to scientific study that could benefit mankind enormously.

October 07, 2007

## **Let couples help stem-cell research**

*EDITORIAL*

Today, Michigan's Catholic parishes are educating their members about stem-cell research. The church also is sending DVDs and other material to more than 500,000 homes encouraging Catholics to support research on adult stem cells but reject the use of stem cells taken from embryos.

It's a nuanced and honorable stance grounded in faith. It's also one we question. Embryonic stem cells appear to have great potential for research and to combat many diseases. State lawmakers have discussed allowing couples to donate their unused embryos from in-vitro fertilization — embryos that would otherwise be destroyed — for such research. We see no reason not to do that if it might help save lives.

The distinction between research on adult and embryonic stem cells is subtle but important. Both are nurtured in labs. Both are grown for research and, potentially, to generate cells and tissues that could treat those who suffer from Alzheimer's disease, spinal injuries, even burns. Both hold tremendous promise to save lives, and that's why stem-cell research has drawn such attention.

Adult cells, however, are more difficult to grow and are limited in what types of cells they can become. Adult stem cells drawn from blood can grow only into blood cells. Embryonic cells are prized for their "plasticity" — their ability to become nerve or muscle tissue or whatever else — and how easily they grow. There are challenges to transplant them into people, but their value for scientific research is significant.

The real issue is one of conscience. Leaders of the Catholic Church and other faiths compare the destruction of an embryo to the taking of a life. That relies on one's belief that even the tiniest creation — a few cells, really — deserves protection. It's fair, too, to raise a broader question of morality: If one is willing to sacrifice a few cells, where will we all draw the line? Is society stepping down a slippery slope?

However, the reality is that these embryonic cells don't feel, suffer or have even the faintest consciousness. And most fertility clinics destroy unused embryos, an accepted practice. Why, then, not put them to use for potentially life-saving research?

The fruits of this research could change millions of lives. It could offer treatment for people suffering from the most common afflictions — diabetes, arthritis, heart disease, Alzheimer's. Breakthroughs may be years away, but the fact that we're able to talk about them is a powerful reason to promote their use.

State lawmakers haven't considered spending public dollars for stem-cell work — as California's voters did two years ago — but lawmakers are talking about giving couples the chance to contribute to it. It would be their decision. The couples could turn over their unused embryos that would be destroyed, anyway.

That is a very limited use of embryonic stem cells, and we think it makes sense.



November 6, 2007

## Essay: Religious Bigotry

JACK LESSENBERRY

Let's suppose that the Christian Science church was immensely wealthy, so much so that they could have undue influence on the Michigan Legislature. Let's further suppose that a radical faction won control over that church, and proclaimed it their sacred duty to prevent anybody from receiving modern medical care.

Not just Christian Scientists, anybody in the state. Hospitals and medical specialists would be outlawed outright. Whatever the few remaining doctors were allowed to do would be severely limited and violations would be subject to harsh penalties.

You can imagine what this would do to our state's economy. Not to mention our state of health. Do you suppose anyone would want to bring new jobs to Michigan? On the contrary, anyone with brains and ability would get out of here as fast as they could.

Well, a version of that is happening in Michigan, right now. But it doesn't have anything to do with Christian Science.

Our future is being held hostage by Right to Life of Michigan, a group which wants to do for medical progress what the Inquisition did for freedom of thought. We are one of the most backward states in the union when it comes to embryonic stem cell research.

Nobody is as backward as we are except North and South Dakota, Louisiana and Arkansas. That's right. Alabama and Mississippi are more enlightened than we are on what scientists generally agree is the most promising medical frontier.

Embryonic stem cell research holds the potential to develop cures for disease, including Parkinson's, diabetes and macular degeneration. Even cautious scientists believe that in time and after experimentation, they may be able to use stem cells and a process called Somatic Cell Nuclear Transfer to regenerate damaged nervous systems. What that means is that people with severe spinal cord injuries may be able someday to get up and walk.

What you would think is that government at every level should be pouring billions into this research. Yet we can't do it at all in Michigan. That's because of religious fanatics who think it violates the sanctity of human life. They want you to think that the scientists want to destroy human life to do this research.

They want to do no such thing. They would use discarded embryos from fertility clinics, leftover tiny lumps of cells that are otherwise thrown in the garbage. President George W. Bush also believes this is wrong.

But all he has done is veto bills denying this research federal funding. Here in Michigan, we have outlawed it totally. Think of what could happen if Grand Rapids' Van Andel Institute or the University of Michigan's medical school were free to work on stem cell research.

Think of not only the scientific but economic boost that could give our state. Right to Life controls too many politicians to let the state legislature do the right thing. What we need, and deserve, is a statewide vote on whether to allow embryonic stem cell research.

Our future is at stake, in every possible way.



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## Michigan Citizens for Stem Cell Research & Cures

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### Why Michigan Should Care About Stem Cell Research

Across the United States and around the world, researchers are learning that stem cells are a key to curing illnesses, conquering cancer and repairing serious bodily damage. Researchers say that adult and embryonic stem cell research need to proceed hand-in-hand to ensure the maximum potential of stem cells are explored. Michigan, however, has laws that hinder embryonic stem cell research, allowing other states and nations to take lead in this exciting and promising area of health research, as well as finding cures and creating jobs.

### About Us

Michigan Citizens for Stem Cell Research & Cures (MCSCRC) is a non-profit coalition formed to educate the citizens of the State of Michigan, including public officials and policy makers, about the complex science, the biomedical potential and the current policies affecting stem cell research in Michigan, in order to promote informed decision making on this important issue. We will present the facts necessary so each individual can form her/his own opinion about stem cell research.

### Who We Are

Our coalition is diverse and ever-growing. Michigan Citizens for Stem Cell Research & Cures includes patient advocacy organizations, business and civic leaders, nonprofit organizations, leading research and medical organizations, policy makers, human service organizations, opinion leaders, members of universities and individual residents from all walks of life and political affiliations.

### Where to Get More Information

MCSCRC has developed an extensive web site where you can find accurate stem cell research information, timely news articles, and links to universities and scientific expert sources for stem cell research.

[www.StemCellResearchForMichigan.com](http://www.StemCellResearchForMichigan.com)

MCSCRC has also developed a clear, easy-to-understand PowerPoint Presentation. Trained speakers are available throughout the state to present to interested groups. Please contact MCSCRC to schedule a free educational presentation.

### How to Contact Us

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## **Frequently Asked Questions**

### **1. What are stem cells?**

Stem cells are a type of cell that can generate many different kinds of mature cells. These cells are the foundation or building block of all tissue in the body. As such they hold the promise of being the body's own essential repair tool. Embryonic stem cells can form any type of cell in the body. In contrast, adult/tissue stem cells are partially specialized and generally only form cells from their tissue of origin. So, blood-forming stem cells can form all types of blood cells, while skin stem cells can form new skin cells.

### **2. How many types of stem cells are there?**

The easiest way to categorize stem cells is by dividing them into two types: adult/tissue and embryonic. Adult/tissue stem cells are found in specific body tissues during fetal development and throughout adulthood. These so-called "adult" stem cells are also found in the umbilical cord and placenta of newborn babies. Embryonic stem cells (ESCs) are found in the inner cell mass of a five-day-old fertilized embryo called a "blastocyst." While there are many different varieties of adult/tissue stem cells in different tissues (blood-forming stem cells, skin stem cells, muscle stem cells, nervous system stem cells, etc.), there is only a single type of embryonic stem cell.

### **3. Where do stem cells come from?**

Adult/tissue stem cells are present in many different tissues from fetuses, newborn infants, children and adults. Adult/tissue stem cells have been found in most organs of the body including the bone marrow, blood, liver, skin, gastrointestinal tract, nervous system and muscle.

Embryonic stem cells are primitive cells that can be generated in a laboratory dish. Scientists isolate stem cells from embryos donated with informed consent of couples who have undergone in vitro fertilization (IVF). These embryos are no longer needed by the donor and would otherwise be discarded.

### **4. How are embryonic stem cells developed?**

Growing cells in the laboratory is known as cell culture. Human embryonic stem cells are isolated by transferring the inner cell mass into a plastic laboratory culture dish that contains a nutrient broth known as culture medium. The cells divide and spread over the surface of the dish. The inner surface of the culture dish is typically coated with mouse embryonic connective tissue cells that have been treated so they will not divide. This coating layer of cells is called a feeder layer. The reason for having the mouse cells in the bottom of the culture dish is because feeder cells release nutrients into the culture medium.





Recently, scientists have begun to devise ways of growing embryonic stem cells without the mouse feeder cells. This is a significant advancement because of the risk that viruses or other contaminants in the mouse cells may be transmitted to the human cells. Because of this risk, the Food and Drug Administration greatly restricts the use of products in patients that have been exposed to animal cells or products of animal cells. Older embryonic stem cell lines are all contaminated by mouse cells and, as a result, might never be permitted to be used in patients. This is one reason scientists would like to be able to study new embryonic stem cell lines that are developed without mouse feeder layers.

Over the course of several days, the stem cells from the inner cell mass proliferate (duplicate) and begin to crowd the culture dish. When this occurs, they are removed gently and plated into several fresh culture dishes. The process of replating the cells is repeated many times and for many months, and is called subculturing. Each cycle of subculturing the cells is referred to as a passage. After six months or more, the original 30 cells of the inner cell mass yield millions of embryonic stem cells. Embryonic stem cells from a single embryo that have proliferated in cell culture for six or more months without differentiating — known as pluripotent — and appear genetically normal are referred to as an embryonic stem cell line. Once cell lines are established, or even before that stage, batches of them can be frozen and shipped to other laboratories for further culture and experimentation [Source: National Institutes of Health].

**5. What are the benefits of studying embryonic stem cells?**

Embryonic stem cell research represents new hope for millions of Americans. Research on these cells has the potential to lead to new treatments for a range of serious human ailments, including diabetes, cancer, Parkinson's disease, Alzheimer's disease, heart disease, birth defects, spinal cord injury and burns.

This extraordinary research is still in its infancy. Research on human embryonic stem cells only began in 1998, while research on adult stem cells has taken place for 40 years.

Practical application will only be possible with additional study. No one can say with certainty how long it will take to find a cure for any specific disease using embryonic stem cells. Typically, biomedical research can take 10, 20, even 30 years to produce successful results. But the sooner the research starts, the sooner it can bring new insights and new treatments.

The Catholic Church is among the leaders of those who oppose embryonic stem cell research, because they believe that life begins as soon as an egg is fertilized. They maintain that embryonic stem cell research is wrong because harvesting these cells kills the living human embryo. The Catholic Church opposes most forms of in vitro



fertilization and the direct destruction of human life for any purpose, including research [Source: Michigan Catholic Conference Focus, February 2005]. However, many Protestant denominations and leaders of many other faiths have said embryonic stem cell research is consistent with their support of scientific research and life-saving cures and treatments.

**6. Do adult/tissue stem cells have the same capability as embryonic stem cells?**

For many years, scientists have conducted studies to determine whether the stem cells in tissues have the same developmental capability as embryonic stem cells. The general consensus is that adult/tissue stem cells are less versatile. Scientists think that embryonic stem cells have a much greater potential than adult/tissue stem cells, because embryonic stem cells may develop into every type of cell in the human body. Adult/tissue stem cells, on the other hand, at this time are only able to develop into a limited number of cell types. Embryonic stem cells also apparently continue to divide indefinitely when placed in culture, while this is not the case for adult/tissue stem cells.

**7. What is nuclear transfer and why do some call it cloning?**

Nuclear transfer is a laboratory procedure that creates embryos for use in stem cell research; sometimes referred to as “therapeutic cloning.” It would allow a physician to create a line of embryonic stem cells genetically identical to a particular patient. These embryonic stem cells could then be used to generate specialized cells that are transplanted into the patient to replace cells lost to injury or disease. When used in a medical treatment, this would ensure that the new cells would not face rejection by the patient's immune system. Nuclear transfer stem cell lines would never be used to “clone” a human because the products would not be implanted into a woman's uterus.

**8. Can nuclear transfer be used to clone humans?**

Reproductive cloning is the process by which nuclear transfer products are implanted in a uterus to create a pregnancy, rather than being used in laboratory dishes to generate embryonic stem cells as in therapeutic cloning. But while reproductive cloning has been achieved with a variety of animal species (such as “Dolly” the sheep), this process is highly inefficient because nuclear transfer products rarely develop normally enough to establish a viable pregnancy when they are transferred into a uterus. Scientists believe that reproductive cloning would be unsafe to attempt in humans, in addition to being ethically questionable. As a result, there is broad agreement among scientists and physicians that while therapeutic cloning is important, that reproductive cloning should be banned. Legislation introduced into the Michigan House and Senate would allow nuclear transfer – a process with obvious research and potential medical interest — while increasing penalties for reproductive cloning.



**9. What federal laws govern the use of adult/tissue stem cells?**

Federally, there are no legal barriers to prohibit the use of adult/tissue stem cells, embryonic stem cell research or somatic cell nuclear transfer. It is however against the law to use federal funds to derive new embryonic stem cell lines by destroying human embryos. Moreover, guidelines implemented at the National Institutes of Health by President George W. Bush have restricted the use of federal funds, such that they can only be used to study the limited number of human embryonic stem cell lines derived before August 2001. Thus, under federal law it is legal to use private funds or state funds to derive new human embryonic stem cell lines, to perform nuclear transfer, and to study any available embryonic stem cell line; however, federal funds can only be used to study embryonic stem cell lines derived before August, 2001.

**10. What would the proposed changes to Michigan's laws do?**

Currently, Michigan law is more restrictive than federal policy. Michigan bans any research on embryos if "the research substantially jeopardizes the life or health of the embryo" without having any therapeutic benefit for the embryo. The law also makes it a crime, with a fine of up to \$10 million and up to 10 years in prison, to use somatic cell nuclear transfer (SCNT) to produce a human embryo. These prohibitions essentially restrict embryonic stem cell researchers in Michigan to conducting research on embryonic stem cell lines imported from other states. Meanwhile, other states are developing robust industries based on research using embryonic stem cells, creating jobs and the potential for important cures.

Rep. Andy Meisner and Sen. Gretchen Whitmer have proposed legislation to reform this law. These proposals would, in general:

- Remove restrictions on the derivation of new embryonic stem cell lines from embryos that are currently discarded by in vitro fertility clinics. The bill would require written consent of donors before the embryos could be used for research
- Allow for the creation of embryonic stem cell lines through nuclear transfer
- Strengthen the ban on human reproductive cloning

The legislation is modeled after the Stem Cell Research Enhancement Act of 2007, which passed the U.S. House and Senate with bi-partisan votes, and a constitutional amendment passed by Missouri voters in 2006.



**11. How does Michigan's ban on embryonic stem cell research affect our state's economy?**

Michigan's ban, which is among the most restrictive in the nation, means private sector as well as academic researchers are unable to conduct many key pieces of basic research into a growing biotech industry. This sends a message that Michigan chooses not to be on the cutting edge of research that is allowed – in fact, financed by state governments – in many other states, including Midwest states such as Illinois, Wisconsin and Iowa. Michigan's ban means that embryos continue to be discarded in Michigan, while in other states researchers use those embryos to create jobs and potential new industries.

**12. Aren't all the important cures coming from adult stem cell research?**

We have been doing adult stem cell research for 40 years, and embryonic stem cell research for less than 10 years. Adult stem cell research has led to some cures. But there are aspects of embryonic stem cell research that can improve the ability of adult stem cell research to work even better – and the expectation is that there are aspects of adult stem cell research that will help embryonic stem cells move toward clinical trials.

Finding or growing sufficient numbers of adult stem cell for a treatment is very expensive and time consuming, limiting cures. Embryonic stem cells can be grown in large numbers, and have potential that adult stem cells have not yet demonstrated.

According to the International Society for Stem Cell research, "The range of diseases (treated by adult stem cells) is still extremely restricted, largely limited to blood disorders and specific cancers. Inherited disorders of the blood and immune system and acquired loss of bone marrow function can be cured with stem cell transplantation....It took approximately 25 years between discovery and routine clinical application of adult stem cell therapy."

When the transistor was created, it was thought to be useful only for hearing aids. If we had stopped research at that point, we would not have the computer revolution that has improved life immeasurably. Similarly, to ban embryonic stem cell research at its infancy is to block development of a potentially world-changing set of cures and treatments. There is room for both types of research. Other states are moving ahead. Michigan should not be left behind.

# CRAIN'S DETROIT BUSINESS

September 18, 2006

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## **Time for state debate on stem-cell research**

Detroit's domestic automakers are still in flux. As current events shape their future, Michigan needs to accelerate strategies to expand other economic sectors.

A good start was the announcement earlier this month of the first 61 grant recipients to share \$100 million in state grants from the 21st Century Jobs Fund for projects ranging from life sciences to alternative energy.

But to truly develop life sciences in Michigan, the state will need a full and open debate on current laws that restrict embryonic stem-cell research that could lead to finding new treatments and cures for diseases and injuries.

Today, a new coalition will kick off a campaign its hopes will lead to Michigan's relaxation of those laws. (This Just In, Page 2.) The coalition includes top names in research at the state's major medical centers and universities as well as nonprofits known for funding research in such illnesses as juvenile diabetes and multiple sclerosis. It also includes some philanthropic powerhouses from the Detroit area: Cynthia Ford and Doreen Hermelin.

Because retrieving embryonic stem cells requires the destruction of embryos, it has become a highly charged political issue. Supporters of the research contend many embryos in reproductive facilities will be destroyed anyway.

A lot of venture-capital and private-equity dollars are looking for life-science investments right now. But Michigan may be overlooked because its laws limit the ability of researchers to use an important tool — embryonic stem cells.

Meanwhile, voters in New Jersey and California have approved funding for adult and embryonic stem-cell research through the sale of bonds. Connecticut passed a law to provide modest grants to do the same. By executive order, the governor of Illinois created the Illinois Regenerative Medicine Institute. Indiana lawmakers created an adult stem-cell research center at Indiana University.

The debate in Michigan is long overdue.

# Detroit Free Press

May 18, 2007

## Stem cell research could boost Michigan economy

LIZ BARRY

My husband and I were always meant to be the parents of our daughters, Rosemary and Rita Mei.

But in the course of becoming a family through adoption, we -- like 10% of couples in the U.S. -- underwent treatment for infertility. For most couples that undergo in vitro fertilization (IVF), more embryos are created than are used in the treatment. Yet, under Michigan law, those 8-celled clusters cannot be used in life-saving medical research. It is lawful to freeze them in perpetuity or to destroy them, but not to put them to good use developing treatments for diseases such as diabetes, cancer and Alzheimer's disease.

This waste is unethical and must be stopped.

Each day in the laboratories where I work, scientists are making breathtaking advances in our understanding of life and in how to treat disease.

Embryonic stem cells are a key tool for understanding and treating the underlying causes of disease. While it is true that adult stem cells are also important, embryonic stem cells are the only cells that can develop into any other type of cell, and embryos are the only source for new stem cell lines.

Existing stem cell lines are limited in number and genetic diversity and cannot be used to study inherited human diseases. Why should we fight for human health with one hand tied behind our back?

We can set and enforce appropriate limits on the use of leftover embryos in research through the same processes in place for making sure research is conducted ethically in other spheres. Scientists who are permitted to do this work already have voluntarily adopted rigorous guidelines. These include only using embryos slated for disposal and making sure that couples give a voluntary, informed consent to donating their embryos for research. The rules prohibit the creation of embryos solely for research purposes and paying for embryos used in research. And, of course, the rules prohibit reproductive cloning.

Some opponents of stem cell research argue frozen embryos should be preserved for use by other couples desiring a family. If there is a way to help others by the voluntary donation of leftover embryos, I would be in favor of it. But, there are so many embryos in storage -- 400,000 in the U.S. alone according to a 2003 RAND report -- that we do not have to choose between these options. The best estimate of the number of couples that would choose to implant a leftover embryo is tiny in comparison to the embryos available.

As a native Michigander, I am concerned about the economic outlook in our state, and I wonder if my daughters will be able to thrive here as adults. Will our community continue to be the special place I grew up in if we cannot build a new base for our economy?

When it comes to stem cell research, our laws are the most restrictive in the nation, tied for last with South Dakota. Scientists in Michigan would go to jail for doing research that California, New Jersey, Maryland, Illinois, and other states support with taxpayer dollars. If there was ever a time to clear away the barriers to economic and scientific progress, this is it. It is time to change our laws and stop the senseless waste of embryos that can be used today -- in our state -- to make life better for many others.

**LIZ BARRY** is managing director of the Life Sciences Institute at the University of Michigan. Write to her in care of the Free Press Editorial Page, 615 W. Lafayette, Detroit 48226 or [oped@freepress.com](mailto:oped@freepress.com).

## Michigan Law

Michigan is among five states with the most restrictive laws on stem cell research. Research that can be done legally in many other states is punishable in Michigan by civil penalties of \$10 million or felony criminal charges punishable by up to 10 years of imprisonment. Many state leaders believe Michigan should open our state laws to:

- Remove restrictions on the derivation of new embryonic stem cell lines to allow Michigan's research institutions to better understand human development, diseases, potential new treatments and develop safer, more effective drugs.
- Establish clear ethical boundaries and oversight requirements for stem cell research conducted in Michigan - including a strict ban on any attempt to clone a human being.
- Protect the rights of Michigan patients to have any stem cell treatments for their diseases and injuries that are allowed under federal law and available to other Americans.
- Assist and reinforce Michigan's economy by attracting and retaining jobs in biotechnology and life sciences.

*"We agree (with Michigan Citizens for Stem Cell Research & Cures)...educating the public is an important way to foster greater support for lifting the restrictions on stem cell research in Michigan."*  
Battle Creek Enquirer

## About MCSCRC

Michigan Citizens for Stem Cell Research & Cures (MCSCRC) formed to educate Michigan residents, public officials and policy makers about the complex science, the biomedical potential and the current policies affecting stem cell research in Michigan, in order to promote informed decision making on this important issue.



Our coalition is diverse and ever-growing. MCSCRC includes patient advocacy organizations, business and civic leaders, nonprofit organizations, leading research and medical organizations, policy makers, human service organizations, opinion leaders, members of universities and individuals from all walks of life and political affiliations.

## Get Involved

MCSCRC has teams of volunteers available to offer presentations at schools, work sites, meetings, public forums and other venues. To learn more about MCSCRC activities in your community, or to become a volunteer, please contact us:

Web: [www.StemCellResearchforMichigan.com](http://www.StemCellResearchforMichigan.com)  
Phone:

(248) 948-5555

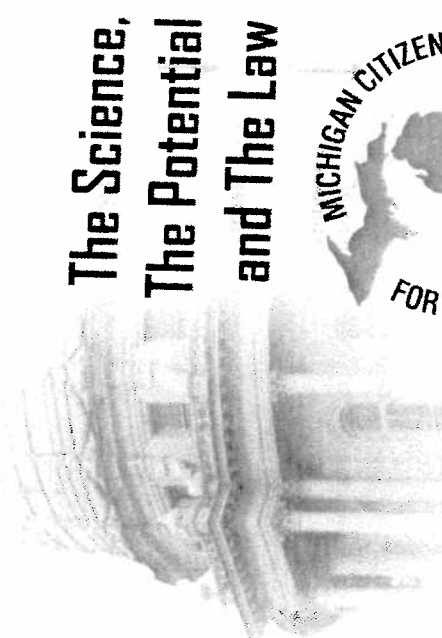
Address:

27177 Lahser Road, Suite 102  
Southfield, MI 48034

Email:

[info@StemCellResearchforMichigan.com](mailto:info@StemCellResearchforMichigan.com)

# Stem Cell Research: What It Means For Michigan The Science, The Potential and The Law



**Stem cells** are the building blocks for every organ and tissue in the body. The hope is that some day stem cells could be used to treat dozens of diseases and injuries.

Stem cells have the **ability to renew themselves** through cell division and to become many different cell types. As the source of replacement

cells for the entire human body, they hold the promise of being the body's own essential repair tool. The difficulty for scientists is figuring out how to grow stem cells in a controlled way so they do the exact repair job needed.

**stem cell research is just beginning.** It is impossible to predict how long it will take to find new treatments. Although most scientists agree stem cell research has brought us to the threshold of a new era of medical discovery, stem cell research also has provoked one of the nation's fiercest political and ethical debates.

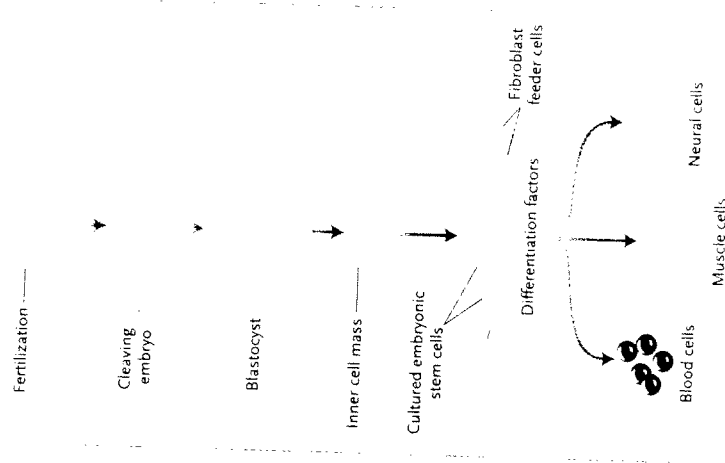
**Michigan Citizens for Stem Cell Research & Cures** is dedicated to educating our state's residents about stem cell research and its potential for life-saving cures and treatments.

**To learn more, please visit the MCSCRC web site:**

## Adult/Tissue Stem Cells

**Adult/tissue stem cells** are present in adults, children, infants, umbilical cords and developing fetuses. Adult/tissue stem cells are limited in the types of tissues they can become and also in the length of time they can be grown in a laboratory. While they are **not as versatile as embryonic stem cells**, medical treatments have been successfully derived from adult stem cells, such as bone marrow transplants to treat leukemias.

Source: New England Journal of Medicine



*Eggs fertilized in a laboratory become blastocysts after about five days. The inner cell mass of a blastocyst, which is smaller than a grain of sand, is removed and placed into a petri dish to first derive ESC lines, and then to form different types of cells such as blood, muscle and neural cells. Embryonic stem cells can be used to study normal human development, birth defects and disease.*

## Embryonic Stem Cells

**Embryonic stem cells (ESCs)** are extremely valuable to researchers because they can reproduce themselves apparently indefinitely and **can become any one of the roughly 200 cells in the human body**. Scientists isolate the inner cell mass from a blastocyst five days after fertilization, and grow those cells in the laboratory to develop ESC lines. Blastocysts are developed from eggs fertilized at in vitro fertilization (IVF) clinics. The eggs are donated with the informed consent of the donors when they are no longer needed for reproductive purposes and would otherwise be destroyed. Human embryonic stem cell research has only been conducted since 1998. Many scientists believe studying these cells **will lead to better understanding and potential treatment of a wide range of diseases and injuries**, as well as the development of safer, more effective drugs.

Research on embryonic stem cells is controversial to those who believe life begins when an egg is fertilized. They believe it is unethical to use embryonic stem cells for the purpose of research if the embryos are destroyed during the process. Others believe it is unethical to allow people to suffer with conditions that could be treated with embryonic stem cell therapies, especially since these embryos are routinely discarded by fertility clinics. Within the scientific community, however, there is little dispute about the need to move forward with all kinds of ethical stem cell research in order to solve important medical problems.